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HISTORY OF NEW RIVER ORDNANCE PLANT

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PULASKI, VIRGINIA

DEPT. ARMY, O.C.O., AMMUN. BR., I.D.
CLASSIFICATION CHANGED TO RESTRICTED
BY AUTHORITY OF THE CHIEF OF ORDNANCE

G. DeBETTIGNIES, SECURITY OFFICER
DATE 26 Oct 1948 AUTH. Col Merle H. Davis

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RG 156 - CHIEF OF ORDNANCE
Entry 646 - Histories of Ordnance Facilities
and Activities, 1940-1945
Box A-131 - New River Ordnance Plant

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RESTRICTEDCHAPTER I
INCEPTION OF PROJECT AND LOCATION OF SITE

The New River Ordnance Plant was established under authority of Act of Congress (Public - No. 703 - 76th Congress) (Chapter 508-3rd Session) (H. R. - 9850) and subsequent amendatory Acts. The purpose of this act was to authorize the building of plants for the production of ammunition, materials, supplies and equipment for the strengthening of the armed forces of the United States.

The site for the plant was selected after Mr. T. Gilbert Wood, Industrial and Agricultural Agent, Norfolk & Western Railway Company, Roanoke, Virginia, had presented to the Dupont Company, the Hercules Powder Company, and the War Department the advantages of locating one of the defense plants in this area. Surveys were made on this section as to available labor supply, topographic features of the land, transportation facilities and other factors that would play an important part in determining the feasibility of locating a defense plant in this section. After an inspection trip by representatives of the War Department, Hercules Powder Company and the Norfolk & Western Railway, the present site was selected for the construction and operation of a bag loading plant. The fact that a smokeless powder plant, The Radford Ordnance Works, was being built approximately ten miles from this site was another point in favor of establishing a bag loading plant here.

The New River Ordnance Plant is located in Pulaski County, Virginia, one mile southeast of the town of Dublin, on U. S. Route #11 and Virginia State Route #100, and seven and one-half miles east of Pulaski. The plant site covers an area of 3,844.325 acres of which 3,827.615 acres

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are owned by the United States Government and 16.71 acres which are leased from adjoining farmers as a right-of-way for water, electric and sewer lines. The land on which the plant is located was for many years owned by farmers, who cultivated and lived on the land. Many of the farms were settled by pioneers of pre-Revolutionary days. The land was purchased by the Government through condemnation and court proceedings to acquire title to it. The Land Acquisition Division of the United States Government handled the work regarding abstracting titles to the farms and all other matters as to the acquiring the land.

The plant was named for the river, New River, which is near it and has played an important part in the industrial development of this section of Virginia. The Appalachian Electric & Power Company built a large dam at the river for the purpose of creating a lake to hold water to generate electricity which is sold to the people of the surrounding towns and in the rural section, and to the plants, mills and business firms of the nearby towns.

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CHAPTER II

HISTORICAL, GEOGRAPHICAL AND INDUSTRIAL
DATA ON THE TERRITORY SUR-
ROUNDING THE PLANT

Pulaski county was settled in 1757 by the Scotch-Irish who came down the Shenandoah Valley and gradually extended the scope of their settlement. The delay in settling this territory was due to a clause in an agreement known as "Boquet's Treaty" negotiated between England and France at the time of the French and Indian War. The clause provided that no English settlement should be made upon the Ohio River and its tributaries. As Pulaski territory is traversed and drained by New River, which empties in the Ohio, the English subjects had no legal right to settle there. After the close of the French and Indian War, and subsequent agreements with the Indians the territory was opened up for the pioneers who were anxious to go westward.

The county of Pulaski and the county seat bear the same name, having been named in honor of Count Casimir Pulaski, of Poland. He came to this country during the Revolutionary War, joined the American forces and after two years of fighting for this country he was mortally wounded at Savannah, Georgia, on October 9, 1779.

The elevation of the land on which the plant is located varies from 1700 to 2000 feet, and is located in the Blue Ridge Mountains of Southwest Virginia. This territory has many of the minerals essential for industrial development, and there are industries in this county engaged in mining and producing goods from the mineral deposits. There are some coal mines in operation, though not on a very extensive scale. For a number of years iron mining and smelting was one of the principal industries of Pulaski, but within the past few years most of the furnaces

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have been sold and moved away. The land in Pulaski County is underlain with limestone and the quarrying of it for building purposes and the mining and crushing of limestone for agricultural use is carried on extensively. Many of the municipal buildings, churches, school houses and college buildings in this territory are made from limestone quarried in this area.

There are varied industrial establishments within the town of Pulaski and in the villages within this and surrounding counties. Lumbering, furniture manufacture, veneer plants and textiles, particularly hosiery and silk mills are the types of businesses employing the majority of the working people and accounting for the greater amount of products manufactured. Other industries of importance are printing, bakeries and those related to processing of farm products. Due to the fertility of the soil and the large amount of grazing land available, the raising of beef cattle, sheep, hogs, poultry, and dairying are important as a source of income for the rural population. Each year many carloads of the above types of animals are shipped to the northern and midwestern packing companies.

According to the reports from the U. S. Weather Bureau the climate of this section is variable. The range in weather conditions, both in temperature and precipitation, shows considerable variance in different sections of the county, due to physical characteristics of the territory.

The climate is healthful. Periods of uncomfortably warm weather or severely cold weather being infrequent and brief. The temperature is usually moderate during the winter months, while the precipitation is well distributed throughout the year and is ample for all requirements. Excessive rains seldom occur and destructive wind storms are

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practically unknown.

The towns in the county and surrounding territory are, Pulaski, the county seat of Pulaski County, with a population of approximately 8,500 before construction of the plant here and at Radford began; Dublin, the town nearest to the plant that had an estimated population of 500, and Draper with a population of 200. Radford in the adjoining county had a population of 9,500 before construction began at this plant and the plant at Radford.

The railroad facilities for the plant are ample. The reservation borders the Norfolk & Western Railway which provides train service for the bringing of propellant charge components and other materials to the plant and for the shipment of charges to depots, ports of embarkation and wherever so directed by the Ordnance Department. This railroad has facilitated the development of this section of the country in that it afforded facilities for the transportation of cattle, farm products and goods manufactured here to outside markets and bring the necessary materials and goods to the people in this territory. The Government built a railroad track on the plant site connecting with the Norfolk & Western and receives cars brought to the reservation and with its own engines, deisel operated, pulls them to the desired point for unloading. The two engines owned by the Government are used to pull loaded cars to the junction of the plant's railroad and the N&W where they are taken by the N&W and starts them on the route for the final destination.

The highways coming near the plant are U. S. #11 and Virginia Route #100, and these are the main routes travelled by people coming to and from work at this plant. These are all weather, macadam roads. It is contemplated by the State Highway Department to make changes in them

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to eliminate curves, provide wider roads in order that they can more fully take care of the traffic.

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CHAPTER III

CONTRACTS AND SUBCONTRACTS FOR THE CONSTRUCTION AND OPERATION
OF NEW RIVER ORDNANCE PLANT

The contract for the designing, furnishing architectural and engineering services, procurement and installation of operating equipment and for the operation of the plant to load propellant and igniter charges and the manufacture of bags therefor was negotiated between the War Department and Hercules Powder Company, Wilmington, Delaware. The Contract, W-ORD-492 was divided into three titles designating specific services the prime contractor was to furnish and certain work he was to do for which he was to receive a fixed-fee. This contract was approved by representatives from the War Department and Hercules Powder Company and signed on December 17, 1940.

The three titles of the contract are briefly as follows: Title I provided that for a fixed fee Hercules Powder Company shall furnish the necessary architectural and engineering services for the constructing of a bag loading plant consisting of four propellant charge bag loading lines and two igniter charge loading lines together with the necessary equipment for operating same. There was to be constructed a bag manufacturing building, offices, warehouses, shops, igloos and other buildings necessary for the operation of the plant.

Title II provided that for a fixed-fee the Hercules Powder Company should procure and install all machinery and equipment necessary for the operation of the plant.

Title III provided that Hercules Powder Company would be the operating contractor of the plant, loading charges as directed by the Chief of Ordnance and in accordance with the proper drawings and specifications on file in the Office of the Chief of Ordnance. For this service the

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operating contractor was to receive a fixed-fee, payable monthly, and based on the operation of the plant 24 hours per day. However, the actual number of hours the plant would operate would depend upon the loading authorization furnished by the Chief of Ordnance.

The contract provided that a third party should construct the plant under a collateral contract. Consequently, a conference was held in the Office of the Quartermaster General, Washington, D. C., in December, 1940, between representatives of the War Department and representatives of Mason & Hanger Company, New York, for the purpose of negotiating a contract for the said company to construct the plant. The contract, W-6451-qm-1, was approved and signed by the proper authorities on December 17, 1940. The estimated cost of construction was placed at \$9,047,075, and the fee for the construction contractor's services was set at \$329,315.

9,376,390
The constructing contractor sub-let part of the work toward the construction of the plant under the following subcontracts:

Subcontract #1, between Mason & Hanger Company and Pendleton Construction Corporation, Wytheville, Va., to furnish 200,000 tons of crushed stone for roads, produced in a quarry on the plant site.

Subcontract #2, between Mason & Hanger Company and Virginia Machinery & Well Company, Richmond, Va., to furnish plant, supervision, insurance, labor and material for drilling, casing and testing an eight inch in diameter well at a location on the site of the New River Ordnance Plant. This contract was later modified to include the drilling of a second and third well under the terms agreed to in the amendments, which were similar to the original contract.

Subcontract #3, between Mason & Hanger Company and The Chicago Bridge & Iron Company for the designing, detailing, furnishing, shipping

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and erecting two one-hundred-fifty thousand gallon elevated steel water tanks.

Subcontract #4, between Mason & Hanger Company and the Westbrook Elevator Manufacturing Company, New York for the designing, detailing, furnishing, shipping and installing eight plunger type elevators.

Subcontract #5, between Mason & Hanger Company and Guy M. Beaty, New York, for the furnishing and installing insulation on pipes, fittings and flat surfaces. This work pertained particularly to the pipes of the heating system in the buildings of the plant.

Subcontract #6, between Mason & Hanger Company and the Cement Gun Company, to design, furnish engineering services and labor for the construction of two 500,000 gallon gunite tanks for storing of water for the plant.

Subcontract #7, between Mason & Hanger Company and the Automatic Sprinkler Corporation of America, New York, for the furnishing plant, supervision, insurance, labor and materials for sprinkler installation in eight bag loading buildings.

Subcontract #8, between Mason & Hanger Company and Crawford & Slaten Company, Charlotte, N. C., for the furnishing plant, supervision, insurance, labor and materials for sprinkler installation in four igniter houses, laboratory, three inert warehouses and the hospital.

Subcontract #9, between Mason & Hanger Company and Century Sprinkler Corporation, Richmond, Va., for the furnishing plant, supervision, insurance, labor and materials, for sprinkler installation in the bag manufacturing building.

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CHAPTER IV

ORGANIZATION AND PRELIMINARY SURVEYS

The Commanding Officer and Constructing Quartermaster of the Radford Ordnance Works, Lieut. Col. M. M. Serrem, Ordnance Department, was appointed to similar capacities at the New River Ordnance Plant in addition to his duties at that plant. He immediately sent a small group of commissioned and civilian personnel to establish offices and form a nucleus for the future staff. A commissioned officer was detailed to be in direct charge of construction and to protect the Government's interest at this plant. He was in charge of both Ordnance Department and Quartermaster Corps activities and was directly responsible to the Commanding Officer for the compliance with the terms of the contract by the contractor in the prosecution of the work.

The civilian personnel transferred to this plant from Radford were heads of the Administrative, Auditing, Purchasing, Materials, Payroll, and Timekeeping Departments. They immediately began to hire additional personnel, through a representative of the Civil Service Commission, to complete the civilian staff of workers. Most of them were under the jurisdiction of the Engineering Department, later transferring to the Ordnance Department when construction was completed.

Office space for the War Department personnel was leased in the Maple Shade Inn, a hotel, and in a former store building in Pulaski. However, some of the War Department offices, such as property and Engineering, were set up in former dwelling houses on the plant site.

The Hercules Powder Company had a contract with the Government to design a smokeless powder plant at Radford, approximately eight miles

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from this plant. Inasmuch as construction at that plant had reached its peak, they transferred some of the key personnel to this plant to set up their offices and start work. They also transferred some personnel from the home office to this plant to serve in an advisory capacity and help to begin the drafting work and other engineering activities. Office space for the Hercules personnel was leased in the Pulaski Hotel and in one of the downtown office buildings.

The constructing contractor also had a contract with the Government to construct the smokeless powder plant at Radford. They also transferred personnel, as available, from the Radford plant and others were transferred from the home office, and in many cases they hired engineers, foremen, and other types of workers from applications made at their employment office. The personnel who came from the home office were here for only a few days or a week or two at the time to establish the offices, and see that the work was started as quickly as possible. These employees transferred from New York for short periods were not paid a salary but were on a per diem basis. Mason and Hanger Company leased office space in a building in Pulaski where Administrative, Purchasing, Payroll, Accounting, Office Manager, and Engineering offices were established.

The construction of the plant was under the direct supervision of the Quartermaster Corps; although, the Ordnance Department had overall supervision and approved all blue prints and drawings. It was the responsibility of the Constructing Quartermaster to see that the buildings, igloos, and other structures on the plant were constructed in accordance with the plans and specifications approved by the Chief of Ordnance. The authority to proceed with the construction of each building, structure or utility was given by the Constructing Quartermaster after the plans

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were studied by the War Department Engineering Staff, who made recommendations for the approval to the Commanding Officer.

Immediately after the constructing contractor established his office in Pulaski he organized crews to survey the plant site, making topographic maps, staking roads, railroads, and sites for the buildings to be constructed. After the surveys were completed, copies of the maps were classified as Restricted and were furnished only to those concerned with the layout, design and location of buildings, and the construction of the plant.

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CHAPTER V

CONSTRUCTION OF THE PLANT

The immediate concern of the contractor after he became established was to procure the necessary equipment to begin construction. The contractor who had other contracts on which work was nearing completion brought some of his available equipment to this project. The majority of the machinery and equipment, such as trucks, tractors, caterpillars, cranes, bulldozers etc., was leased from various companies. The contract stipulated that the lessor should be paid a certain amount of rent each month while the equipment was in use at this project, which was contemplated to be six months. The contract for the renting of the equipment was approved and signed for the Government by the Constructing Quartermaster's representative and by a representative of the machinery company and the constructing contractor.

The Constructing Quartermaster established a department that kept a record of each piece of equipment rented, giving lessor, name and description of equipment, monthly rental paid, any liens against it and who held them, records of payment of rent, cost of repairs and the number of hours the equipment was in use, which was ascertained by the time checking department. This section pre-audited all contractor equipment payrolls before they were submitted to the Finance Officer. They also reported to the Constructing Quartermaster the status of the equipment, giving the number of pieces here, according to type, number of pieces received during the week, weekly equipment payroll, and the valuation of all equipment on the plant.

The contract contained a clause which provided that the Government

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could recapture the equipment by paying the difference between the amount of the total rent paid and the valuation of it plus one percent per month or fraction thereof that it had been in use. The Government took advantage of this clause and many instances, when the equipment had served its purpose here, it was recaptured and transferred to another project. The project receiving it paid this station by suballoting funds for the value of it. At the close of construction many pieces of equipment were recaptured for use at the plant by the operating contractor.

Supplies and materials for use in construction of the plant were purchased by Mason & Hanger Company, the constructing contractor. They complied with War Department Procurement Regulations then in force relative to bids, awarding of contracts, etc. The Government Procurement Department pre-audited all requisitions and bids, checking them for prices, delivery dates, then if it was found to be alright, a purchase order was issued and forwarded to the Constructing Quartermaster for approval.

Upon receipt of materials at the plant, the Government Materials Department checked them for quantity, compliance with specifications, whether they were in accordance with the description given on the purchase order, and the condition of the goods upon arrival. The material was then checked in on incoming tally sheets, copies were sent to the Property Section to prepare receiving reports on same and make entries on the property record cards maintained by them.

Administration buildings were started for both the contractors and the War Department personnel. As soon as they were completed they were occupied, this being about May 1, 1941. After the construct con-

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tractor completed his work, the War Department personnel moved into it and are now located in that building.

When offices were constructed on the plant site and the administrative forces moved into the buildings, no facilities were available to furnish meals to the employees. However, the constructing contractor gave permission to an individual to operate lunch stands and canteens on the plant site. This concessionaire did not have adequate facilities to serve hot lunches but sold sandwiches, drinks, candies, and the usual canteen line of goods. Many of the people brought their lunch with them, others drove to nearby filling stations that operated lunch stands in connection with their activities, and some of the employees bought sandwiches, cakes, drinks from the canteens. This method of furnishing meals continued during the greater part of the construction period until the cafeteria was completed and ready for operation.

The operating contractor negotiated a contract Cooleys Inc., Dublin, Virginia, to operate the cafeteria, mess halls, and lunch stands on the premises of the New River Ordnance Plant. The contract provided that Hercules would equip the cafeteria ready for operation, installing all the equipment necessary for it to meet the health and Sanitation Department's standards. The cafeteria was inspected daily by the plant physician and the safety office to see that a sanitary condition was maintained with respect to the handling and preparing the food. All food handlers were required to report to the plant hospital by-weekly for a physical examination.

The contract with Cooleys stipulated that they should carry insurance to protect the workers and also the Hercules Powder Company against

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suits arising from injuries to employees or from customers because of food poisoning.

Cooleys prepared sandwiches, coffee, and box lunches for people working in the bag manufacturing building and the loading lines. The price of the box lunch was 25¢ each, and the cost of sandwiches were from 10--20¢. They also operated canteens throughout the plant area selling the usual line of canteen goods--drinks, candies, cakes, sandwiches, smokes, etc. The canteens were designated as points where the workers could meet during the rest period to smoke. The cafeteria began serving three meals daily except on Sundays when they did not open for business due to the fact that few people worked at the plant on that day. During the week the number of patrons of the cafeteria was fairly high; the meals adequate and satisfactorily prepared and served at a cost from 30¢ upwards.

In consideration of the rights and privileges to operate the cafeteria and mess halls on the plant site, Cooleys agreed to pay Hercules Powder Company 5% of the gross proceeds derived from the sales and services. The books were audited monthly by a local certified public accountant to determine the amount of profit made and the amount due Hercules under the terms of the contract. An employee from the Government Fiscal Section was assigned the duties of checking the books and financial statements and to study the report submitted monthly by the accountant.

As soon as the contractors got their forces located here and obtained sufficient engineering equipment to make the necessary surveys they began to make preparations to start construction as quickly as possible. The Engineering Department of Hercules Powder Company began drafting the plans for each particular structure, submitting it to the

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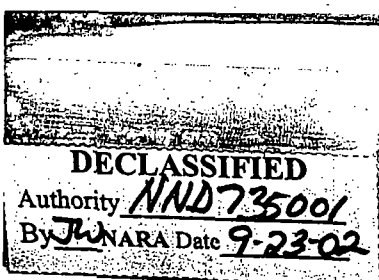
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Commanding Officer for study and approval. When approved, sufficient copies of it were blueprinted and distributed to those concerned with the construction work. The original tracings became the property of the Government.

Actual construction began at the plant on February 10, 1941 at 1:00 P.M. by Mason & Hanger Company, the construction contractors. At that time scrapers were moved into the area west of Route #100 and levelled a space for the Mason & Hanger Employment Office. From this time on every effort was made to acquire all the necessary materials, equipment and sufficiently large force of employees to keep construction according to the schedule established by the Chief of Ordnance. Inasmuch as construction began during the winter season, it was difficult to reach the optimum in construction until spring when the weather cleared and the ground became dry enough to move the heavy equipment over it.

Mason & Hanger Company hired all their construction workers at their office built on the edge of the reservation. Each person hired was required to fill out forms regarding his past history, giving date of birth, place, education, job qualification, where they had previously worked, etc. Also, each applicant was required to undergo physical examination to determine his or her physical fitness for doing the type of work for which he was hired; each employee was fingerprinted, his picture made for use in making a badge, which all employees were required to wear for identification purpose while on the plant site.

The wage rates that were put into effect were approved by the Secretary of Labor or her duly authorized representative. Any change in the established rate or the adding of a rate for a new group had to be approved by the Secretary of Labor, which was handled for this office by the Quartermaster General, to whom all such applications were sub-



mitted. This plant was not constructed under an agreement with a labor union and no strikes were experienced because of unsatisfactory wage rates. The personnel in charge of construction desired to pay wages that were comparable to those in like trades and industries in this vicinity; the rates were similar to those paid at Radford during the construction at that plant. One of the commissioned officers was appointed labor relations officer to handle any complaints, if any arose, and to initiate action to make reports to the Quartermaster General relative to same.

After the contractor was given permission to begin work on a particular building, he prosecuted the work in such a manner as would enable him to complete it within the shortest time possible. Due to the fact that most of the land was underlain by limestone rock some difficulty in excavation was encountered but with the use of dynamite and other explosives it was possible to do this work without too much delay.

As each building was completed it was inspected by the contractor, a representative of the Constructing Quartermaster and a representative of the Ordnance Department. If the building was accepted, this was indicated by completing a form describing the building and sending it to the Quartermaster General and the Chief of Ordnance.

About the first of January, 1942, the plant was virtually completed and the loading lines were all in operation. The only thing that lacked 100% completion was the installation of some equipment on which there was a delay in the delivery. A conference was held between the Area Engineer (formerly the Constructing Quartermaster), representatives of Hercules Powder Company, Mason & Hanger, and the Chief of Ordnance. It was decided that the equipment could be installed by the maintenance force of the operating contractor as well as doing the remaining construction work. Ac-

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cordingly the constructing contractor was notified that his contract would be terminated effective January 31, 1942. Mason & Hanger then dismissed, or transferred to other projects where they had contracts, all their personnel at this plant. Thus, New River Ordnance Plant was completed and ready to go into full operation to load propellant charges for the armed forces of the United States and its allies.

COMMUNICATIONS

During the period of construction the constructing contractor negotiated a contract with the Chesapeake & Potomac Telephone Company to furnish telephone service for both the contractors and the War Department. The system was established by the telephone company, it retained ownership of the property, did all the work of installing or changing the system and rented it on a monthly basis. These services were paid direct by the contractor, who was later reimbursed by the Government.

After the construction contractor's services were terminated, the Government then furnished the Signal Officer, Third Service Command a statement of the telephone service needed during the operation of the plant, together with the cost of same. The Signal Officer then issued a service order written on a master contract they had with the American Telephone & Telegraph Company to furnish the service on a rental basis. Each month thereafter the Executive Officer submitted to the Signal Officer a statement and cost of any changes in the service during the month, and a service order was issued to cover this change. The Government paid direct for this service.

The Government procured teletypewriter service through the Signal Officer, Third Service Command from the Chesapeake & Potomac Telephone

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Company, on a monthly rental basis. There is a charge made for each connection at rates similar to those for long distance telephone calls. In accordance with a directive from the Chief of Ordnance attended teletype service is maintained twenty-four hours per day, seven days per week.

The Western Union Telegraph Company, at the request of the Government, installed a teleprinter machine at the plant for the purpose of sending and receiving telegrams, both for the contractor and the War Department. Each are billed separately, but the Government pays the telegraph bills direct at Government rates.

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CHAPTER VII

PLANT SECURITY, SAFETY AND MEDICAL SYSTEMS

The Commanding Officer is responsible for the functioning of the plant security and safety system. However, the actual guarding and protecting the plant is done by a force of guards and firemen employed by the contractor, Hercules Powder Company. A commissioned officer has been appointed Plant Protection Officer, Fire Marshal and Safety Officer, whose duty it is to inspect the guard forces, check them while on duty at their post, check the fire protection system to see that everything is in a usable condition and is readily accessible if needed. He makes written reports to the Commanding Officer giving any abnormal conditions that were found together with a suggested procedure for correcting same. A letter is then written to the contractor informing him of the discrepancy that was found and request that action be taken to correct it.

As stated above, the contractor is in direct charge of the guarding and protecting the plant. He has employed a former member of the Waterloo, Iowa, detective force to head the guards. The Captain of the Guards is in direct charge of the force, and it is his duty to see that everyone performs his duties in the prescribed manner and that his conduct while on duty meets the standards set up for this department. Each person who is hired as a guard is thoroughly investigated regarding his loyalty, his past history, and also to determine his fitness to become a guard at this plant. Each guard, when he is hired, is given a thorough medical examination and is also fingerprinted. The guards are required to memorize and know thoroughly the General Orders. Each week the guards are given close order drill to teach them how to properly carry themselves,

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to instill in them a military spirit, to respect the authority of superiors and how to properly receive and pass on to his relief any special duty or assignment from the Captain of the Guards or any other superior officer.

The part of the plant where manufacturing is going on or where any powder is handled or stored is inclosed by a six feet chain link fence with two strands of barbed wire above. This area is known as the "guarded area." Guards are stationed at every entrance to this area and check the badge of each person as he or she enters to see that the person has the required identification badge. Each person is asked whether he has any matches or not, and if he has, they are taken by the guards.

The areas around the Administration and Employment buildings do not have the chain link fence as the areas mentioned above do, but are inclosed by a barbed wire fence with warnings attached thereon for people, other than employees at the plant, to stay off. Guards are stationed at various points in these areas to check upon those entering the buildings. At nights and weekends, guards are posted at entrances to these areas and at the buildings to prohibit entrance by those other than regular employees, and these must show their identification card to gain entrance.

The entire area of the plant site is surrounded by posts every one hundred (100) feet and on which are installed electric lights. These lights are used at night to enable the guards to ascertain whether any person is trying to gain entrance to the plant by climbing the fence. A patrol road surrounds the plant site just inside the fence, and a guard in a station wagon patrols it every fifteen minutes. Guards are assigned to patrol the highways, on motorcycle, that pass by the plant to keep the

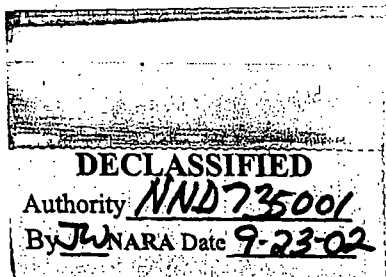
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motorists within the authorized speed limit. Two way radios are used so that contact may be immediately made with guard headquarters in case of danger, riot, etc., to send help to the point where it is needed.

Elevated guard stations are placed approximately every seventeen hundred and fifty feet (1750) around the area inclosed by the chain link fence. Each station has an oil heater in it to make the place more comfortable for the guards during the winter months. Too, each station has a telephone in it so that guard headquarters can be contacted in case of an emergency, or if the captain or the officer in charge of the guards on any shift desires to contact a guard without making a tour of the plant.

The Fire Department is housed in a building separate from, but near the Guard Headquarters, and a force is kept on duty at all hours to be ready for call in case of fire. Each member of the Fire Department is instructed how to use the different types of fire fighting equipment, to inspect periodically the equipment in the various buildings to see that it is maintained in good condition and how to combat the various types of bombs, in case of an air raid. Each fireman is required to take the Red Cross First Aid Course and be able to administer first aid in case of an emergency. The Fire Department also instructs the occupants of the various buildings how to operate the equipment located there. They also conduct fire drills at irregular intervals, teach the occupants to leave the buildings in an orderly manner going a safe distance, particularly in case of an air raid. Others are assigned the duties of operating the equipment located in or adjacent to the buildings and each is taught how to do his respective job.



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The Safety Officer supervises the conduct of the safety program of the contractor. He is assisted by two civilian inspectors, who together with the Safety Officer, or separately, make daily trips over the plant inspecting closely all equipment, installation and operation of same, storage of materials and supplies, particularly powder, to note whether there is any violation of the Ordnance Department Safety Regulations. The inspectors make frequent tours of the loading lines to see whether the employees are complying with current safety regulations and directives regarding the handling of powder, loading of same, packing the charges, and observing the safety limits as to personnel in each loading line. Too, the loading and unloading of powder and propellant charges are inspected to determine whether there is a violation of regulation governing these procedures. Frequently the inspector makes immediate corrections and often he takes notes and makes a written report to the Safety Officer regarding the violations. A letter of instruction is written to the contractor advising him of the violation of the safety regulations and informs him as to what corrective action should be taken.

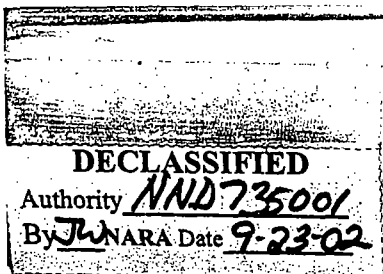
BADGES AND PASSES

All employees at the plant have been fingerprinted and the cards have been forwarded to the Federal Bureau of Investigation at Washington for file. Each person is photographed and this picture is used in preparing the identification cards and badges required of personnel at this plant. The identification card is required to be carried at all times and for those working in the administration buildings it is now their basis for entrance to the plant. The card contains the person's name, his or her picture, height, weight, age, color of hair and eyes, and

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any identification scars or marks. A badge is made for each employee, which is composed of the person's picture with his payroll number written in the corner of it inserted in a round holder with "New River Ordnance Plant, Pulaski, Virginia", stamped on it. Each person, during the construction period, was required to have his or her badge in a conspicuous place so it could be easily seen by the guard. During the early part of construction, guards checked the cars as they left the highway and entered the road to the plant, anyone who failed to have his or her badge was refused admittance to the plant. Later this system was revised and guards were stationed at the entrance to the buildings and checked the employees as they entered to work. A particular type of badge was assigned to each area of the plant inside the guarded area. If a person wished to go from one area to another it was necessary to go to the guard headquarters, identify himself, then procure a badge for that particular area. When he left that area he had to go back to guard headquarters, turn in that badge, and secure his regular one. The officers were assigned badges that permitted them to go from one area to the other. Visitors coming to this plant were required to have proper identification credentials and have all arrangements regarding the visit made prior to his arrival. He was assigned a visitor's pass which allowed him to enter certain areas. He was accompanied on the trip through the plant by an officer or some responsible person connected with the Ordnance Department or the contractor. The entrance of visitors, from other plants, representatives from Washington and representatives from foreign governments is permitted in accordance with the provisions of Army Regulations and directives issued by the Chief of Ordnance.



BLACKOUTS

The plant has been organized to participate in trial blackouts which are carried out under the auspices of the Office of Civilian Defense. During the blackouts the plant does not shut down production but all outside lights are cut off for a few minutes in order to familiarize the people working at the plant with their duties when actual air raid occurs. Plans for complete blackout have been formulated to follow when warning is received that enemy planes are coming in this direction. The guards have been instructed as to their specific duties when either of the warnings is given so that the plant can be blacked out as quickly as possible. A large siren has been placed on a tower at the fire department building that can be heard over the entire plant area. The siren is blown at regular intervals to keep it in good working condition.

MEDICAL SYSTEM

In order to care for the medical needs of the employees, the contractor built a hospital for this purpose. Adequate equipment and facilities have been procured for the diagnosing and treating of various types of diseases and wounds. Three doctors are regularly employed by the contractor to take care of examinations when personnel are hired and to examine those who become ill or are injured while on duty. A staff of graduate, registered nurses are on duty at all hours to take care of minor injuries, dress wounds, give medicine to those who need it, when it is for minor illnesses such as headaches, upset stomach, etc., spray employees' noses and throats for colds and such other service when it is evident that the patient is not seriously ill and does not require the attendance of a physician. When a person is injured he or she is required

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to report to the hospital, regardless of the fact that the injury might be considered minor, for treatment. An injury card is filled out giving the nature of the wound, the patient's name, how the injury occurred, and other pertinent information; he is required to report back to the hospital in order that the progress of the healing may be followed until it is well. All the contractor's employees are required to report to the hospital on the day he or she returns to duty, except when prior approval of the absence has been granted, for an examination to determine whether he or she has been, and if so, whether they are able to return to duty. Also, all employees are required to undergo a physical examination annually, a record of the findings are made and a check is made to compare the person's present physical condition with that of the previous year.

During August, 1941, there were a few cases of typhoid fever in this area. In order to prevent the spread of it and protect the workers of this plant for a possible loss of time in the future due to this disease, vaccine serum was procured and all employees were given the examination. In the spring of 1942, under the auspices of the Virginia State Board of Health, all employees were given chest X-rays, free of charge, to determine whether any of them had tuberculosis. In cases where the pictures showed that there was a possibility of a person having the disease, he was given another examination and a very thorough study made of the findings, and he was advised to go to a specialist for further examination and treatment if there seemed to be reason to suspect that the person had tuberculosis.

The plant has available at all hours an ambulance to take injured employees to the hospital for treatment. In case of disasters arrange-

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ments have been made with local funeral directors to make their ambulances available to take the more seriously injured to the hospitals in Pulaski or Radford, which are approximately eight miles from the plant. It is the belief of those in charge of the medical system at this plant that the time necessary to administer first aid and prepare a person to go to the hospital is about equal to the time that is required for the ambulance to reach the plant. Hence there would be no delay in getting the patient to the hospital. To date this plant has not experienced any disaster or an epidemic of any kind. The lost time accidents have been relatively small.

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Operating the Plant

CHAPTER VIII

PREPARATIONS FOR OPERATING THE PLANT

In order that the loading of propellant charges could begin as soon as the loading lines were completed the Ordnance Department and the contractor began to make the necessary provisions. The Ordnance Department was charged with the procurement of certain items for the loading of the charges, such as powder, silk cloth, cotton cloth, thread, etc. A staff was organized to make a study of the applicable specifications and determine what materials and in what quantities would be needed to begin operations. The Chief of Ordnance was contacted and was informed what this plant would need to load the charges authorized by his office.

The Ordnance Department was required to inspect the loading operations, inspect each charge as it was completed before it was accepted for shipment. Accordingly, the Government hired its inspectors from Civil Service Register and sent the first group to Picatinny Arsenal to undergo a period of training in the loading and inspecting of propellant charges. This course of training was for a period of two weeks. After their return to this plant some went directly to the loading lines, as operations had just begun, and others were sent to the training school established at this plant to act as instructors.

The contractor hired a group of employees who were to become key operating personnel, such as shift supervisors, loading line foremen, during operations. These employees were sent to Picatinny Arsenal and Carney's Point, N. J. to study bag loading. After they had completed this course they returned to this plant, some going directly to the loading lines to begin work and others were detailed to the training school

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as instructors.

As soon as one of the warehouses was available, machinery and equipment was installed to begin a training school for those who would make the bags, load the charges, and supervise the various operations connected with the work at this plant. A group of personnel were hired by the contractor for the various jobs, paid them wages approved for learners or beginners, and kept them in this school until they had fully mastered their particular job in the loading of propellant charges. As one group completed the course they were transferred to the loading lines and a new group was hired to undergo the period of training.

The contractor procured cloth, grains, such as wheat, cracked corn, etc., for use in making bags and loading charges in the training school. The inspectors who had been to Picatinny and Carney's Point acted as supervisors of the school at this plant. They instructed the personnel how to perform each particular operation, inspected the bag to see that the cutting of the cloth, printing of the type of charge on the end of it, and sewing of the parts of the bag together conformed to the specifications furnished by the Chief of Ordnance for that particular type of charge. The bags were then loaded with the grain, procured for this purpose, the inspectors teaching the operators each step in loading the charge and inspected it when completed, noting and bringing to the attention of the operator any deviations from the specifications. This procedure was followed for each group of employees hired and after they had completed the course they were transferred to the loading lines. All inspectors hired by the Government and by the contractor, after the first group was trained at Picatinny or Carney's Point, were trained in the

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school here. As a result of this school it was possible for this plant to transfer to other plants that were later completed and brought into production many inspectors qualified for these jobs in bag loading plants. It was decided that this plant could substitute employees who did not have the required courses in Chemistry as sub-inspectors, as a knowledge of that subject was not necessarily needed to inspect charges for their workmanship and compliance with the applicable specifications.

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CHAPTER IX

PRODUCTION OF PROPELLANT CHARGES

As soon as each loading line and igniter line was completed, it was immediately brought into production. The personnel were trained in the school at this plant (which was discussed previously) and their course of training was arranged so that they would complete it at about the same time the loading lines were completed. The dates of completion of the loading lines and igniter lines are as follows:

Loading Line #1 - - - - - December 15, 1941

Loading Line #2 - - - - - November 1, 1941

Loading Line #3 - - - - - October 10, 1941

Loading Line #4 - - - - - September 27, 1941

Igniter Line #1 - - - - - November 1, 1941

Igniter Line #2 - - - - - November 1, 1941

The loading of propellant charges based on operation of twenty-four hours per day was estimated to be as follows:

<u>No. of Lines</u>	<u>Type of Charge Loaded</u>	<u>No. of Charges Produced in 24 hrs.</u>	<u>Powder Loaded in 24 hrs.</u>
2	105 mm. How	16,000	46,000 lbs.
1	155 mm. How M2	8,000	66,000 lbs.
2	155 mm. Gun M1918	<u>4,000</u>	<u>100,000 lbs.</u>
		28,000	212,000 lbs.

2 Igniter Charge Lines

This was an estimate and is not to be considered as the actual amount that would be loaded nor the only types of charges as that would depend upon the authorizations furnished this plant by the Chief of Ordnance.

The Office of Chief of Ordnance furnished this plant production orders which authorized the loading of a specific type and number of

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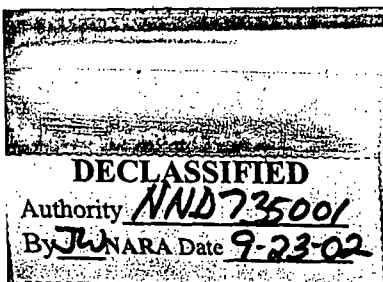
charges. Too, it furnished the required drawings and specifications that gave detailed instructions as to the procedure in loading the charges, and at the same time they furnished ballistic data on each powder lot that was to be loaded here. This information was used to determine the size of each section of the bag and the amount of powder to load in each section of the charge. After the receipt of this data, the Planning Section of the Ordnance prepared Expenditure Orders authorizing the contractor to proceed with the making of bags and loading the charges.

Cloth was taken from the warehouses to the bag manufacturing building where it was dyed and cut into proper shapes and sizes to make the bags. Inspectors from the contractor and the Ordnance Department inspected the bags as they passed each production stage to determine whether the cutting and sewing conformed to the applicable specifications. After the bags were completed they were taken to the loading lines for loading the charge.

The Ordnance Department has a laboratory on the plant site that has the necessary chemical supplies and equipment and has a staff of chemists to make various tests of the cloth, thread, and other components to determine whether they are suitable for use in loading the charges.

The powder that is used in loading the propellant charges is furnished this plant from Radford, Indiana, Alabama and other ordnance works after it has been tested and accepted by the Chief of Ordnance. The powder is shipped to this plant for storage until the loading authorizations are furnished to proceed with the loading of it.

During the process of loading the powder, the Ordnance Department has trained inspectors on duty in each line to inspect the charges as they are loaded, checking the sewing and the packing the powder and



finally with the use of gages the charges are inspected as to size and whether it will fit the type of gun for which it is made. After the charge is thoroughly inspected, and if accepted, the inspector stamps his initials on the bag, it is put into a container and taken to the magazines for storage or is immediately shipped to some depot or port of embarkation.

The production of charges is under the supervision of the Ammunition Division, Chief of Ordnance but after it is loaded the Field Service takes charge and issues orders regarding shipments. A section of the Property Department is in charge of loading the cars, making the bracing in the cars to prevent damage to the shipment and releasing the cars to the carrier to take them to their destination.

m Since operations have begun at this plant the Inspection Department has made the following recommendations to the Chief of Ordnance for changes in loading procedures and the action taken is as indicated below:

Permission was requested to use sodium chloride (common salt, run-of-the-mine type) in place of sodium sulphate, specified in U. S. Army Specification 27-3 and 27-2, for use in fixing the dye used in the dyeing process at this plant. This accomplished the same purpose at a greatly reduced cost. The Chief of Ordnance had several tests made at Picatinny Arsenal to determine whether there was any appreciable difference in the results after using both these dye fixes. After the results of the tests were sent to the Chief of Ordnance, authority was given to use sodium chloride as dye fixe and the specifications were changed accordingly.

Permission was requested to make pc. mk 71-9-157G of drawing 71-9-157, dated May 7, 1939, to read that the strap tying may be manu-

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factured from single thickness 2" wide, not stitched, Grade "E" Cartridge Bag Cloth. This drawing has been revised so that pc. mk 71-9-157G is a strip of Grade "E" silk cloth 2" x 24", without folding or stitching.

This plant requested to change the method of putteeing 155 mm Gun, M1, charges effecting a material saving of 130 to 150 inches of Grade "A" cotton cloth 2 $\frac{1}{2}$ " wide, also saving labor and increasing the actual speed of operation. This request was granted and the propelling charge drawings were to be changed accordingly.

Permission was requested to use a silk reinforcing strip in the manufacturing of the 8" gun Charge. It was found that the fold through which the lacing twine is passed became badly torn when lacing twine was tightened. To overcome this a small strip of scrap "Grade A or B" silk placed over the reinforcing thread before sewing the thread in the fold of the body. This resulted in a better distribution of the tensile force of the lacing twine and eliminated rejections because of tearing of the bag cloth. This request was approved by the Chief of Ordnance.

Since this plant began operation the following production orders have been received by this office and type of charge and status of the order is as shown below:

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PROD. ORDERS REC'D. AND WORKED ON THROUGH Sept. 30, 1942	CALIBER & MODEL OF GUN & CHARGE	ORIGINAL QUANTITY OF ORDER	ORDER INCREASED TO -	PRODUCTION STARTED	CHARGES MADE THROUGH Sept. 30, 1942	PER CENT COMPLETED THROUGH Sept. 30, 1942	REMARKS
A-1402	105 MM. How., M2	2,191,000	2,823,000	Oct. 2, 1941	2,820,915	99.9	Order Completed July 27, 1942 at 2,820,915 charges.
A-1435	155 MM. How., M1917- 18 M2 (White Bag)	2,247,437	2,260,699	Nov. 19, 1941	1,146,366	50.7	Production was shut down on March 28 at 1,146,366 chgs. (no pow. avail.)
A-10,720	155 MM. Gun, M1	400,000	—	Jan. 9, 1942	400,224	100.7	Order Completed on July 31, 1942 at 400,224 charges.
DA-A-12,009	155 MM. How., M1, M3 (Green Bag)	360,000	396,000	June 1, 1942	400,167	100.7	Order Completed on August 21, 1942 at 400,167 charges
A-10,709	105 MM. How., M2	1,477,000	5,977,000	July 15, 1942	817,832	13.6	Prod. Order DA-A- 6402 transferred to this order on 1,000,000 chgs (P.A.O. 50,429)
A-1465	155 MM. Gun, M1	259,672	—	Aug. 1, 1942	31,742	12.2	—
A-10,740	155 MM. How., M1, M3 (Green Bag)	40,000	1,616,899	Aug. 20, 1942	194,834	12.0	—
A-1464	8" Gun, MK. VI, Mod. 3A2	13,120	—	July 28, 1942	10,888	82.9	Order Completed on Sept. 30, 1942 at 10,888 chgs. (No Powder Avail.)
A-10,754	8" How., M1, M1, (Green Bag)	154,233	—	Aug. 10, 1942	77,802	50.4	—
A-1466	10" Gun, M1888 & 1895	3,400	—	Aug. 15 1942	3,271	96.2	Order Completed Sept. 30, 1942 at 3271 charges.

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PROD. ORDERS REC'D AND WORKED ON THROUGH Sept. 30, 1942	CALIBER & MODEL OF GUN & CHARGE	ORIGINAL QUANTITY OF ORDER	ORDER INCREASED TO -	PRODUCTION STARTED	CHARGE LOADED THROUGH Sept. 30, 1942	PER CENT COMPLETED THROUGH Sept. 30, 1942	REMARKS
DA-A-64,02	105 MM. How., M2	1,000,000	---	---	---	---	Cancelled June 2, 1942, and quantity and funds transferred to Prod. Order A-10,709
A-10,768	8" Gun, MK. VI, Mod. 3A2	8,570	---	---	---	---	Prod. Order was never worked on.
A-12,125	FOR TEST LOADING OF AMMUNITION	---	---	---	---	---	---
A-12,230	FOR THE MFG. OF CART. BAGS & IGNITERS FOR PROOF PURPOSES	---	---	---	---	---	---
A-13,000/ 25/A	FOR THE MFG. OF CART. BAGS FOR CHG. PROP. M1A1 (Green Bag) 155 MM How., M1917-18	2,100	---	---	BAGS 2,100	100.	---
A-10,719	4.7" A.A. Gun, M1 Igniter Assembly	579,000	---	Nov. 2, 1942	None	---	---

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LIST OF EXHIBITS FOR THE HISTORY OF

NEW RIVER ORDNANCE PLANT

1. Contract W-ORD-492.
2. Extract of Public Law No. 703 - 76th Congress.
3. Conference between representatives of Mason & Hanger & Quartermaster Gen.
4. Contract W-6451-qm-1
5. Excerpt from "Virginia, A Guide to the Old Dominion."
6. Article by Mr. T. Gilbert Wood, Norfolk & Western Railway
7. Synopsis of New River Ordnance Plant by Hercules Powder Co.
8. Powder Plant Construction In Virginia--By Mr. Howard L. King, Engineer for Mason & Hanger Company.
9. Ltr. Chief of Ord. 12/11/40, Sub: Proposed Advance Provisions in the Proposed Contract with Hercules Powder Company,
10. Ltr. Chief of Ord. 12/13/40, Sub: Proposed Advance Provision in the Contract with Hercules Powder Company.
11. Ltr. Chief of Ord. 12/19/40, Subject: Appointment (Lt. Col. M. M. Serrem)
12. Ltr. Chief of Ord. 12/27/40 to Lieut. Col. M. M. Serrem
13. Ltr. Chief of Ord. 1/18/41 Sub: Type of construction for new plants
14. Ltr. Chief of Ord. 12/30/40, Sub: Procedure for Loading Plants
15. Ltr. Chief of Ord. 5/27/41, Sub: Delegation of Authority
16. Ltr. Chief of Ord. 12/10/41, Sub: Appointment as contracting officer's Representative
17. Conference 1/2/41 regarding organization for New River Ordnance Plant
18. Report and plan of action Area Fire Control, NROP, 10/15/41
19. Ltr. Hercules Powder Co., 3/20/41
20. Ltr. Hercules Powder Co., 8/7/41
21. Annual Report, this office, 8/17/42 to Chief of Ordnance
22. Ltr. Hercules Powder Co., 2/8/42
23. Ltr. Hercules Powder Co., 2/11/42
24. Memorandum from Mr. Hance
25. Ltr. Norfolk & Western Railway Co., 4/11/42
26. Memorandum from Mr. Hance, 4/14/42
27. Memorandum from Mr. Hance 4/15/42
28. Memorandum from Mr. Hance, 5/22/42
29. Ltr. Hercules Powder Co., 5/26/42
30. Map of distances traveled by employees at NROP
31. Ltr. this office 2/5/42, Subject: Camouflage
32. Ltr. this office 2/6/42, Subject: Relations with the Guard Force
33. Memorandum from Mr. W. E. Piper, 2/12/41
34. Ltr., Hercules Powder Co., 2/18/41
35. Ltr., Hercules Powder Co., 2/18/41
36. Memorandum from Capt. A. A. Price, 2/19/41
37. Ltr. fr Col. Serrem 2/20/41
38. Ltr. fr Mr. Piper 2/26/41
39. Memorandum fr Mr. Piper 5/2/41
40. Ltr. 12/24/41, Subject: Policy of the Office of the Attorney General
41. Ltr. this office 12/20/41, Sub: Reimbursement to Hercules Powder Company for Bonus Paid its Employees
42. Ltr. this office 2/5/42, Subject: Payment of Bonus and Extra Compensation
43. Memorandum from Mr. Lincoln 1/6/42 giving list of work to be completed at New River Ordnance Plant

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- ✓44. Ltr. this office, 1/22/42, Sub: Request for Stop Order for the New River Ordnance Plant
- ✓45. Ltr. from Mr. Foulke, 1/31/42 RE: Termination of Construction
- ✓46. Ltr. thks office 2/23/42 to Chief of Ordnance
- ✓47. Ltr. this office 5/8/42 Subjct: Acceptance of Completed Work
- ✓48. Ltr. fr Capt. Walborn 5/31/42 to HPC RE: acceptance of completed work
- ✓49. Ltr. this office 2/5/42, Sub: Water and Sewer Connection for Dormitories
- ✓50. Ltr. this office 5/26/42, Sub: Sale of Water to New River Defense Housing Project DH-VA-27
- ✓51. Ltr. this office 9/5/42, Sub: Sale of Water to New River Defense Housing Project DH-VA-27
- ✓52. Ltr. fr Col. Gallup to HPC 9/29/42
- ✓53. Ltr. fr N. R. Miller to C. O. NROP
- ✓54. Ltr. this office 10/9/42, Sub: Sewage and Water Service for Dormitory Units
- ✓55. Ltr. fr Mr. Bean to Mr. Piper 3/8/41
- ✓56. Ltr. fr Mr. Bean to Mr. Piper 3/12/41
- ✓57. Ltr. fr Mr. King to Capt. Beckham 3/19/41
- ✓58. Ltr. fr Capt. Beckham to Mason & Hanger Co., 3/20/41
- ✓59. Ltr. fr Mr. Piper to Capt. Beckham 4/1/41
- ✓60. Ltr. fr Mr. Piper to Mr. Messer, 5/7/41
- ✓61. Memo fr Mr. Piper to Mr. Ellis, 5/20/41
- ✓62. Ltr. fr Mr. Piper to Col. Wiggins, 5/26/41
- ✓63. Memo fr Mr. Piper to Mr. Roney 7/24/41
- ✓64. Report of conference 9/15/41
- ✓65. Ltr. Chief of Ord. 4/2/41, re training inspectors & Chemists
- ✓66. Teletype Chief of Ord. 4/18/41
- ✓67. Ltr. Chief of Ord. 4/9/41, re training inspectors & chemists
- ✓68. Ltr. Chief of Ord. 4/17/41, Sub: Training of Key Operating Personnel
- ✓69. Ltr. fr. Mr. Piper to Col. Serrem, 2/25/41
- ✓70. Ltr. Chief of Ord. 4/16/41, Sub: First Three Months Loading Schedule
- ✓71. Ltr. Chief of Ord. 4/25/41, Sub: First Three Months' Loading Schedule
- ✓72. Ltr. Chief of Ord. 6/10/41, Sub: First Three Months' Loading Schedule
- ✓73. Ltr. this office 7/21/41, Sub: Partial Operation of Plant
- ✓74. Ltr. this office, 11/28/41, Sub: Loading Schedule for 155 MM Gun Charges
- ✓75. Ltr. this office 12/29/41, Sub: Strap typing for chg. Prop. 155 MM Gun M1
- ✓76. Ltr. this office 1/1/42, Sub: Strap typing for charge, propelling, M3 (Green Bag) for 155 M/M Howitzer M1.
- ✓77. Ltr. this office 1/7/42, Sub: Delay in starting production off charges, propelling for 155 MM Gun, M1
- ✓78. Ltr. this office 1/15/42, Sub: Method of Putteeing 155 MM Gun Charges
- ✓79. Teletype Chief of Ord. 2/6/42
- ✓80. Ltr. this office 1/15/42, Sub: Fixe for dye for Cartridge Cloth
- ✓81. Ltr. this office 2/3/42, Sub: Production at New River Ordnance Plant
- ✓82. Ltr. this office 2/12/42, Sub: Cartridge Cloth, Grade "A"
- ✓83. Ltr. fr Mr. Breidenstein to Chief of Ord. 3/17/42
- ✓84. Ltr. Chief of Ord. 3/19/42, Sub: Increased Width of filling opening on zone 6 and 7, 155 mm Howitzer, M2 Charge
- ✓85. Ltr fr Lt. Billings, to HPC, 3/24/42
- ✓86. Ltr. Chief of Ord. 3/24/42, Sub: Putteeing Propelling Charges
- ✓87. Ltr. Chief of Ord. 4/6/42, Sub: Use of Waste Grade "C" Silk
- ✓88. Ltr. fr Mr. Gant to C. O. NROP, 7/8/42
- ✓89. Ltr. fr Mr. Gant to C. O., NROP, 7/8/42
- ✓90. Ltr. this office 7/31/42, Sub: Increase in Production Schedules, Request for

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By JW NARA Date 9-23-02

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- ✓ 91. Ltr. this office 8/14/42, Sub: Production schedule 10" gun M1888 & 1895
- ✓ 92. Ltr. this office, 8/15/42, Sub: 10" Gun, model 1888 and 1895
- ✓ 93. Ltr. this office, 8/18/42, Sub: Spacers and fillers used in packing 105 mm Howitzer bags for shipment to shell loading plants
- ✓ 94. Ltr. this office, 8/22/42, Sub: 10" Gun, Model 1888 and 1895
- ✓ 95. Ltr. this office, 9/3/42, Sub: 8" Gun, Mk. VI, Model 3A2, (Navy)
- ✓ 96. Ltr. this office, 9/21/42, Sub: Suggested change in laced type charge bags
- ✓ 97. Teletype Chief of Ord.
- ✓ 98. Ltr. this office Sub: Charges, propelling for 105 m/m How.m M2.
- ✓ 99. Teletype Chief of Ord. 11/12/41
- ✓ 100. Memo Chief of Eng., 5/25/42 re assignment of projects to districts
- ✓ 101. Copy of contract with Cooley's Inc.
- ✓ 102. Ltr. Chief of Ord., 4/30/41, Sub: Transmittal of Prod. Ord. Form 7252
- ✓ 103. Ltr. fr Col. Wiggins to Mr. Bean 7/17/41
- ✓ 104. Ltr. Chief of Ord. 7/21/41, Sub: Priority Ratings on Ammunition not Extensible to Facilities
- ✓ 105. Ltr. Chief of Ord. 8/2/41, Sub: Explanation of Forms
- ✓ 106. Ltr. Chief of Ord. 8/25/41, Sub: Igloo Design and Construction
- ✓ 107. Ltr. This office, 9/18/41, Sub: Prod. Ord. for Prop. Chgs. 155 mm Gun
- ✓ 108. Ltr. fr Col. Holmes to HPC, 12/16/41
- ✓ 109. Ltr. this office 12/12/42, Sub: Carrying of Matches
- ✓ 110. Ltr. Asst. Area Engr., 5/4/42, Sub: Lightning Protection on Igloo Magazines
- ✓ 111. Ltr. Rad. Ord. Works, 9/12/42, Sub: Memo of Agreement w/ copy of agreement
- ✓ 112. Release of claim for additional Fee 3/25/42
- ✓ 113. Release (Signed by Mason & Hanger Co.) 3/25/42
- ✓ 114. Pamphlet giving in detail duties of the various departments of War Department Employees, New River Ordnance Plant
- ✓ 115. Safety Manual published by Hercules Powder Co., New River Ordnance Plant

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SYNOPSIS OF NEW RIVER ORDNANCE PLANT

I. CONTRACT - A contract was entered into by the United States Government and the Hercules Powder Company, designated number W-ORD-492, and signed December 17, 1940. This contract was for architectural and engineering services in connection with the constructing and equipping of a plant for the loading of propellant and igniter charges and for the manufacture of bags for such charges. The contract also covered the procurement and installation of operating equipment, preparation for operation (including training of operating personnel), and for the operation of the plant after construction had been completed.

II. LAND - Acquisition of land was negotiated by the Land Acquisition Division of the United States Government under the supervision of Mr. Fitzpatrick. The total acreage in the plant site, including rights-of-way for power, water and sewer lines, is approximately 3,844.325 acres.

III. PERSONNEL - Mr. W. E. Piper was placed in charge of the plant November 12, 1940 as Manager. Mr. Ernest D. Bean was placed in charge of engineering with the title of Supervising Engineer, January 6, 1941. Mr. Piper and Mr. Bean arrived in Pulaski January 7, 1941 and were located at No. 8 Valley Street, Pulaski. Mr. N. S. Hampton was transferred from the Radford Ordnance Works January 20, 1941 as Chief Clerk of the Accounting Department and Mrs. K. S. Wheeler was transferred from Radford Ordnance Works January 21, 1941 in the capacity of Secretary to Mr. Hampton.

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By *JW* NARA Date *9-23-02*

Mr. H. V. Woodruff reported for duty April 9, 1941, coming to this plant from the New Jersey Powder Company, having the title at this plant of Office Superintendent in charge of the Accounting Department, which was then located in the Argonne Grill, Pulaski, Virginia.

Mr. Johnson Roney II was in charge of drafting, all work being done from the Wilmington, Delaware office until June 2, 1941 at which time the engineering and drafting work was transferred to the present Hercules Administration Building.

Mr. M. P. Sarfaty, assisted by Mr. Ray Colburn, was in charge of purchasing working out of the Wilmington Office until July 15, 1941 when Mr. Colburn and Mr. Tom S. Brown, Jr., arrived in Pulaski to organize the present Purchasing Department.

Detective Sgt. L. H. Wilson of the Richmond, Virginia Police Department was employed March 1, 1941 as Captain of the Guards, reporting for duty March 10, 1941, along with Sgt. J. H. McConnell, formerly of the Virginia State Police Force, at which time the above mentioned men started the organization of the present guard force. Capt. Wilson was located in the Argonne Grill for approximately two weeks at which time Guard Headquarters was set up in a building on the plant site, East of Route 100 adjacent to the Railroad underpass. Headquarters was located there until October 1941 when the new buildings now in use were completed.

Mr. John D. McNabb was employed March 25, 1941 as Superintendent of Services which included the Medical department, Employment Department, Guard Force, Safety Department and Fire Department.

Mr. A. R. Hance was employed March 31, 1941 as Personnel Director. Mr. W. F. Skelton reported May 9, 1941 to take

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charge of the investigation of personnel being employed at the plant. The Employment, Investigation and Personnel Departments operated from No. 8 Valley Street, Pulaski, Virginia until October 1941 when they moved into their present location.

Mr. Earl H. Cain formerly employed as a Lieutenant in the New York City Fire Department reported for duty May 10, 1941 in the capacity of Fire Chief.

Mr. George R. Foulke, Jr., was employed March 3, 1941 in the capacity of Assistant Manager, working out of the Wilmington, Delaware Office at that time.

Mr. O. B. Case was employed as Superintendent of Production April 14, 1941.

Mr. L. C. Kleinhans was employed in the capacity of General Superintendent May 1, 1941.

III. CONSTRUCTION - Actual construction on the plant began at 1:00 P.M. February 10, 1941 by the construction Contractors, Mason & Hanger Company, of New York City. At that time three power scrapers were moved into the area West of Route 100 and levelled a space for the Mason & Hanger Employment Office, which is now used as our Recreation Building. The first equipment arrived on the plant site Saturday afternoon, February 8, with actual work being started as stated above.

Mason & Hanger Employment Office was occupied March 21, 1941. The Contractor's office building was occupied May 2, 1941 but was not fully completed until July 15 of the same year. The Hercules Administration Building was occupied June 2, 1941 by the Engineering Department, and June 26, 1941 by the Accounting Department.

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The dates of starting and completion of the different buildings and facilities of the plant are as follows:

<u>Item</u>	<u>Started</u>	<u>Completed</u>
Railroad	2/21/41	10/22/41
Loading Line No. 3	5/26/41	10/10/41
Loading Line No. 4	5/20/41	9/27/41
Loading Line No. 1	5/30/41	12/15/41
Loading Line No. 2	5/30/41	11/1/41
Combined Shops	6/1/41	11/1/41
Paint and Oil Storage	6/8/41	10/22/41
Supply Storehouse	5/22/41	10/22/41
Lumber Storage	6/15/41	7/1/41
Gate House	9/15/41	10/22/41
Laundry	9/15/41	11/1/41
Inert Storage Warehouses	4/8/41	9/1/41
Administration Building	4/1/41	7/15/41
Contractor's Office Building	3/8/41	7/15/41
Garage	5/31/41	7/5/41
Employment Office	7/22/41	10/1/41
Cafeteria and Equipment	5/8/41	9/15/41
Guard Headquarters	6/15/41	10/22/41
Fire Station	6/1/41	10/15/41
Sentry Boxes	7/15/41	8/27/41
Smokeless Powder Igloos	6/1/41	10/31/41
Black Powder Igloos	6/1/41	10/8/41
Freight Office (Scales)	6/15/41	10/22/41
Truck Scales	9/1/41	10/22/41
Transfer Platforms	7/22/41	9/15/41

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Wells	4/1/41	8/1/41
Elevated Tanks	7/28/41	10/1/41
Igniter 1	5/30/41	11/1/41
Igniter 2	5/30/41	11/1/41
Laboratory and Equipment	7/15/41	11/15/41
Substation	6/15/41	10/15/41
Fences	6/15/41	10/15/41
Parking Areas	5/1/41	11/15/41
Incinerator	9/8/41	11/22/41
Sewer Lines	7/8/41	11/30/41
Staff Residences	7/25/41	12/15/41
Water Dist System	8/9/41	12/15/41
Black Powder Dry Group	7/25/41	12/31/41
Change Houses	7/8/41	1/1/42
Sewage Disposal Plant	7/8/41	12/13/41
Bag Manufacturing Bldg.	6/15/41	12/13/41
Filter Plant	7/8/41	12/31/41 (95% complete)

IV. OPERATION - The first trainees being trained for later operations of the plant were sent to Picatinny Arsenal at Dover, New Jersey, and to the Curtis Bay Arsenal, Curtis Bay, Maryland. These trainees were under the supervision of Mr. L. C. Kleinhans and Mr. O. B. Case, the latter spending the greater portion of his time at the Picatinny Arsenal with the trainees. About June 30, 1941 the trainees who were at the above mentioned arsenals reported to the plant site at Pulaski, Virginia. On July 1, 1941 a Training School was established in Warehouse 103, and the actual training of sewing machine and loading line operators started.

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Sewing machines were installed in the South portion of this building and a replica of a loading line installed in the North portion. Sewing machine operators were trained by making the actual bags, starting with 105 mm. and later 155 mm. These bags were used by trainees for the powder lines, using corn with which to load the bags. This training program was continued in Warehouse 103 until the time that actual production for powder was started. The actual loading of powder was first started September 24, 1941 on Line 4-A. The Bag Manufacturing Building was completed in December 1941 and the moving of the sewing machines from Warehouse 103 to the Bag Manufacturing Building was started about December 25 and finished about December 29. Operations started in the present Bag Manufacturing Building about January 1, 1942.

V. GENERAL REMARKS - Dr. James D. Greger was transferred from the Radford Ordnance Works where he had been employed in the capacity of Assistant Medical Director, assuming the duties of Medical Director at this plant. The office was first established in the Crowell Building, Pulaski, Virginia and moved in September 1941 to the present Employment Office. A first aid room had been created in the Training School in Warehouse 103 under the supervision of Mrs. Mary S. Hiltzheimer, Chief Nurse. The Medical Department moved into the present Hospital Building December 15, 1941.

Our present Cafeteria was opened for use September 5, 1941 and was operated by Cooley's, Inc. at that time.

On October 1, 1941 Mr. George R. Foulke, Jr., was promoted from Assistant Manager to Manager, replacing Mr. W. E. Piper who was transferred to Wilmington, Delaware. Mr. L. C. Kleinhans was promoted to Assistant Manager and Mr. O. B. Case to Plant Superintendent.

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(ORIGINAL
(Rec)**RESTRICTED****POWDER PLANT CONSTRUCTION IN VIRGINIA**

by Howard L. King, Chief Engineer
Mason & Hanger Company

The State of Virginia was chosen by the War Department as the location of a smokeless powder manufacturing plant and a bag-loading plant. Work on the powder plant was begun in August, 1940 and the first unit was put in operation in May, 1941. The bag loading plant was started in January, 1941 and its first line was operating in September. The powder manufacturing plant is much the larger of the two, as far as the cost of the plant and the number of operating employees is concerned. The two plants are twenty miles apart.

The factors governing the choice of location for plants of these types are several. First, they should be inland because sea-ports have other demands upon their facilities. Second, they should lie not within, but fairly near to towns or cities where the operating force can find homes. Third, they should be on a good railroad and near a highway. Fourth, the topography of the land should be such as to permit economical construction and the value of the land that has to be acquired should not be too high. The sites chosen by the War Department for the two plants we are considering met all of these requirements within a reasonable degree of satisfaction. The site of the bag loading plant was on rolling farm land with bed rock in many places at or near the surface, conditions that made layout somewhat difficult and excavation costly.

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In both instances, the government chose the Hercules Powder Company of Wilmington, Delaware, as architect-engineer, to design the plants. In the case of the manufacturing plant Hercules was also designated as constructing contractor but with the Government's sanction, the Hercules Company delegated or sublet a large part of the construction work to the Mason & Hanger Company of New York. In the case of the bag loading plant, the Government chose the Mason & Hanger Company as constructing contractor. Both plants are now being operated by the Hercules Powder Company.

All of the contracts, that is the architect-engineer contracts, the construction contracts and the operating agreements were cost-plus-fixed-fee contracts. This form of contract states in some detail the work to be done, gives an estimate of the cost and of the time for completion, states the conditions under which the work must be performed, lists the expenses that will be reimbursed to the contractor by the Government and specifies a fixed fee as compensation. The reimbursed expenses are labor, material, plant rental, insurance, supervision and administration. Practically the only costs that are not reimbursed are those associated with the contractor's main office, and legal and financing costs. These costs are covered by the fixed fee. The fee is small in comparison with the cost and rightly so because the contractor takes no risk.

We are concerned with the construction contracts. Except for the large subcontract given to the Mason & Hanger Company at the manufacturing plant, the construction contractors were expected to do the greater part of the

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work themselves without the employment of subcontractors. Subcontractors were, however, employed for specialties, such as furnishing and installing certain machinery, elevated water tanks, gunite reservoirs, sprinkler systems and pipe covering. When subcontracts were necessary, they were usually placed on a lump sum or unit price basis after the taking of bids.

A vast quantity of contractor's equipment was necessary for the construction of these two plants. Trucks of all types, concreting equipment, portable compressors, wagon drills and cranes had to be obtained in large numbers. At the manufacturing plant over a thousand pieces of large equipment were in use and at the bag loading plant, six hundred. Under the contract terms, such equipment was rented from the lowest bidder. The lease agreement, which was not valid until approved by the Constructing Quartermaster, fixed the basic shift rental and set the value of the equipment. The agreement stipulated that when the rental paid equalled the value of the equipment, plus 1 % per month for the period rented, the equipment became the property of the Government and that the Government might, at any time prior to becoming owner, transfer the plant to any other defense project where a new lease agreement would be entered into, without loss of the Government's equity in the plant. The result of this form of lease agreement was that the owner of the equipment sold his plant to the Government on an installment plan, except that the Government could return the plant if at any time it wished to terminate the transaction.

This method of providing plant worked out very well; it was eminently fair to the Government as no plant could be sold to the Government until

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after it had been tested by use; it was fair to the owner as the rates paid were reasonable; and it worked well for the constructing contractor because it made it possible for him to obtain new plant or old plant for every need of construction. In most instances the manufacturers of new equipment would not enter into a lease agreement directly with the constructing contractor but the same result was achieved through the medium of an equipment dealer or distributor, who first bought the plant from the manufacturer on a financed basis.

Eventually all the plant became the Government's property except those pieces that were in the repair shop too often. These were turned back to their owners as soon as better plant could be found elsewhere. The care and servicing of all this equipment was a function of the constructing contractor and the facilities provided were excellent. In some instances the lessor kept a representative on the work to advise and assist the operating personnel. This precaution repaid its cost to the lessor as it kept his plant working and earning rental.

At the powder manufacturing plant the number of construction workers employed reached a maximum of over twenty thousand and at the bag loading plant seven thousand; the peak at the loading plant was not reached until after the manufacturing plant had begun to release workers. The workers in the skilled trades were drawn from the locality and from nearby and distant states. These were experienced and many of them were union members. The semi-skilled workers and common labor came from many sources including the farms of the surrounding locality.

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It is scarcely necessary to point out that the automobile was a factor of the greatest importance in getting the men to the job. Groups of five or six workers from towns as far away as fifty miles would drive in together in a car belonging to one of the group. In addition to this mode of transportation, local bus lines added special runs to their ordinary schedules. The War Department authorized special trains on the railroad from larger towns or cities up to forty miles distant. The commuters were charged a flat rate of 25 cents each way. The railroad was paid the operating cost, the difference between the operating cost and the revenue being a subsidy paid by the Government for the good of the project.

No barracks were constructed for construction workers but barracks were built for future operating personnel. A number of shacks were erected by local people to house workers; other families lived in trailers. Fortunately there were not too many of these shanties and trailer camps which are likely to be unsanitary. There was no epidemic; employees were given free anti-typhoid vaccination if they wanted it. Only about one third took the usual three inoculations. Local people were most cooperative in the matter of taking boarders.

All employment was handled through employment offices set up by the constructing contractor. The Virginia State Employment Service was given space in these buildings, and assumed the duty of interviewing applicants and determining their fitness for employment under specific labor classifications. The classified applicant was then given a physical examination. If there was a job for him (and there usually was) he was photographed and fingerprinted and assigned to a foreman. The direct-positive method was used in photographing; under this process it was possible to hand to the worker

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his metal-rimmed badge with his picture and employment number framed in the badge, within a few minutes after he was photographed.

Rates of pay for all persons on a weekly or a monthly basis conformed to a schedule worked out by the constructing quartermaster and the contractor. Where there were comparable positions locally, the local salaries were lower. The higher salaries paid on the Government work were justified because the work was temporary and because, although higher, they were only high enough to secure the needed number of competent men and women. No employee on a weekly or monthly basis was paid for overtime or for Sunday or holiday work, except that foremen were paid extra for Sundays during one period where work was required for seven days a week. Generally speaking, we did not work on Sundays.

Rates of pay for common labor and for semi-skilled and skilled workers were in accordance with a schedule issued by the Secretary of Labor at the beginning of the project. These rates were higher than those previously prevailing in the locality but lower than the union rates paid in the metropolitan centers on the coast. This labor scale was not immutably fixed; the contractor was charged with the responsibility of reporting to the constructing quartermaster any instance when the promulgated rate was lower than the prevailing rate in the vicinity or when the promulgated rate was insufficient to attract the necessary number of workers in any trade. The contractor dealt with his employees and with union business agents in a number of instances where there existed dissatisfaction with the rate, and subsequently made his report and recommendation to the army officers. In a moderate number

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of cases the wage scale was altered after due consideration had been given the matter in the office of the quartermaster general.

The only trades that had union shop agreements with the general contractor were the bricklayers on both jobs and the operating engineers at the bag loading plant. There were conferences on many occasions with other union delegates; the contractor, recognizing the competence of union men, was desirous of employing them but not to the exclusion of non-union men. The ambition to secure a closed shop caused one strike of electricians but the work was not stopped.

On instructions from the office of the Quartermaster General, one and one-half times the basic rate was paid in all trades for all work performed in excess of forty hours in any one week. The contract itself required the payment of time and a half for all work over eight hours in any one day. Time-and-a-half was not paid for Saturday or Sunday work as such, except in the case of the bricklayers.

Construction work was carried on three shifts, round the clock, as far as that was practical. A large part of the work, especially excavation, road building and railway construction, work on which artificial lighting is impractical or unsatisfactory, was carried on on two shifts, from dawn till dark.

The contractor's field organizations for the two contracts were entirely separate. In each case an officer of the company was designated to live near the job, to exercise general supervision and to maintain liason with the contractor's officers in New York. The work at the site was in the hands of the job manager. The following remarks apply more particularly to

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the bag-loading plant but the basis at the manufacturing plant was not very different.

Five men reported to the job manager; they were the job engineer, the general superintendent, the office manager, the employment manager and the chief physician. The job engineer was in charge of the topographical survey and mapping, the receiving and distribution of plans prepared by the architect engineer, the preparation of amplifying detail drawings, progress reports, engineering supervision of construction, cost accounting and cost reports and taking off of quantities from the architect-engineer's drawings and preparation of requisitions for purchase.

The general superintendent had charge of all construction and receipt and distribution of materials; he was charged also with foreseeing the plant and equipment needs and with maintaining the plant and equipment that was given him to use. The master mechanic, the chief electrician and the superintendents in the various trades reported to him. So also did certain area superintendents who acted as assistants to him in organizing the work in specific areas.

The office manager had charge of purchasing, accounting, checking of workmen's time, preparation of payrolls, checking of rental time on equipment and preparation of plant rental payroll and all insurance matters. The duties of the employment manager and of the chief physician need no description.

All of the contractor's activities were insured. In the case of the manufacturing plant, the insurance contracts were negotiated by the contractor. In the case of the bag loading plant, the Government took bids

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in Washington. Defense jobs are, generally speaking, good risks from the point of view of the carrier because due regard for safety is always required and payrolls are large. The stock companies obtained authorization from the S State Rating Board to quote rates lower than the manual rates; that made it possible for them to compete with the mutual companies that offered a dividend. Further competition was brought about by making a combined bid for workmen's compensation and public liability in which the charge for public liability was practically nothing.

All purchases of materials, except gas and oil and part of the lumber, were made by the contractor after getting competitive bids. Every purchase order was examined and approved by the field auditor before it was placed and every invoice was similarly approved before payment. At the powder manufacturing plant the Government financed the work by providing the contractor with a drawing account but at the bag-loading plant, the contractor supplied his own capital. So close was the cooperation between the Government auditing and fiscal staff and the contractor and so efficient were both staffs that during the most active months on this project, the contractor's funds were turned over four times within one month. That is to say, expenditures and reimbursements in one month were four times the amount of money actually used.

The engineering side of construction did not present any great difficulties. In the case of each contract, the chief problem was one of administration to bring about rapid construction. Some interesting features may be mentioned. At both plants, the first task was to make a topographic survey which was, of course, to serve for layout of the plant.

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An equally urgent necessity was to extend a siding from the railroad into the plant site and to build a storage yard for bulk materials, such as concrete aggregates, lumber and pipe. When construction was at its peak, about eighty carloads of materials were received and unloaded daily.

Concrete was an important building material at each plant but its use was not required in extremely large quantities. At the powder plant, crushed stone and manufactured sand were purchased from existing quarries and brought in by railroad. The contractor had a central mixing plant and distributed the mixed concrete in agitator trucks. The manufactured sand produced an excellent concrete and required less cement per yard of concrete than natural sand. When the bag-loading plant got under way, the facilities of existing quarries where sand was manufactured were taxed to their utmost by the needs of the powder plant. It was therefore decided to bring in natural sand from a considerable distance. Stone for roads was obtained by setting up a crusher plant and opening a quarry on the site. The contractor used bulk cement. He set up a modern batching plant and used transit-mix trucks for mixing and distribution.

The roads constructed were of macadam base with a bituminous-bound surface. This type was selected upon the recommendation of the Virginia State Highway Department. In general, they proved satisfactory but those roads that had to be built during the winter were, of course, used before the binder and surface-coat were placed on them and they had to be rebuilt in the summer.

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The manufacturing plant was of a type of construction that will last thirty years. The bag-loading plant, was built of less lasting materials; the objective in this case was a plant for five-year use. As a matter of fact, however, both plants are well constructed and will last almost indefinitely if they are properly maintained.

Col. M. M. Serrem was the ordnance officer in charge of both contracts. At the manufacturing plant he was assisted by Lt. Col. G. F. Griffith and at the bag loading plant, at the start by Capt. W. P. Beckham and later by Lt. Col. Stanley B. Wiggins.

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NROP 319.1

August 17, 1942

SUBJECT: Annual Report.

TO : Office of the Chief of Ordnance,
Pentagon Building,
Washington, D. C.THRU : Field Director Ammunition Plants,
Ordnance Department,
3637 Lindell Boulevard,
St. Louis, Missouri.

1. In compliance with paragraphs 3 and 4, letter Office of Chief of Ordnance, dated July 28, 1942, the following report is made:

a. Command: The Command of New River Ordnance Plant for the past year was:

July 1, 1941 - December 15, 1941
Lt. Col. Mark M. Serrem, Ordnance Department

December 15, 1941 - June 30, 1942
Col. Lucian D. Booth, Ordnance Department.

b. Plant Facilities: This plant was designed by the Hercules Powder Company as Architect Engineer under Title I of Contract No. W-ORD-492, dated December 17, 1940. The Plant was constructed by Mason & Hanger Company under Collateral Construction Contract No. W-6451-qm-1 dated December 17, 1940. The operating equipment was procured by Hercules Powder Company under Title II of their above-mentioned contract and Supplement I thereto. This operating equipment was installed by Mason & Hanger Company under Supplement No. A of their above-mentioned contract.

The plant is located in Pulaski County southeast of the town of Dublin on U. S. Route 11 and Virginia State Route 100 and covers an area of 3,844.325 acres of which 3,827.615 acres are owned by the United States Government and 16.71 acres are leased as a right-of-way for water and electric lines.

The plant consists in general of six areas as follows:

INSIDE OF GUARD FENCE:

1. Bag and Igniter Loading Area

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2. Magazine Area
3. Warehouse and Shop Area

OUTSIDE OF GUARD FENCE:

4. Administrative Area
5. Staff House Area
6. River Pumping Area

These areas in general are as follows:

1. Four Loading Lines and two igniter lines comprise this area. Each loading and igniter line consists of two loading buildings, with the required incoming and outgoing storage magazines and one personnel canteen, all connected by covered wheeling ramps. Each line has a self-contained heating system which includes its own oil-fired boilers. Electricity, water, and sewage are connected to the plant's central system.

2. The Magazine Area consists of 87 Igloo type concrete magazines, 80 ft. long and two similar magazines 41 ft. long, each with the own access road from the main roads.

3. The Warehouse and Shop Area consists of 13 Inert Storage Warehouses and a Bag Manufacturing Building. Also in this area are located various buildings necessary for the operation and maintenance of this plant, such as Combined Shops, various storage buildings, Laundry, Men's and Women's Change Houses, main entrance Gate House, Guard Headquarters, gasoline and oil storage and a main boiler house.

4. The Administration Area consists of two office buildings (War Department's and Contractor's), Employment Office, Laboratory, Hospital, Cafeteria, Garages, etc.

5. The Staff House Area consists of fifteen residences heated by a small central heating plant located in this area.

6. The River Pumping Area consists of a Pump House on New River approximately two miles from the plant, reached by 3/4 mi. of Virginia County road No. 662 and 1 1/4 mi. of Government-owned road. A right-of-way has been purchased through which passes the water line and electric pole line. Also included in this area is another right-of-way through which the outfall sewer passes discharging into New River about 2 miles below the Pump House.

UTILITIES:

Water is pumped from New River to a filtration plant located approximately in the center of the reservation and there stored. From this

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(Red)

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storage, it is pumped over the entire plant. The River Pumping Station consists of one electrically driven 350 gpm service pump with a duplicate pump as a stand-by, also two electrically driven 1000 gpm fire pumps with a third similar pump as a standby. Here water is pumped through a 12 inch pipe to the Filtration Plant which has a capacity of 420,000 gpd and is stored in two 500,000 gallon concrete Gunnite Tanks. The Plant Pump House has similar capacity and equipment to the River Pump House except that three 1,000 gpm fire pumps each have ~~have~~ an auxiliary gasoline motor. This equipment pumps the water from the Gunnite Tanks into the Plant System and into two 150,000 gallon elevated steel tanks located about $1\frac{1}{4}$ miles apart and connected with 18 inch steel pipe line.

SEWAGE:

Sewage is fully treated in a 400,000 gpd treatment plant located on this reservation discharging through a 15 inch gravity outfall into New River. All plant sewers are gravity except that three small pumps are used to force sewage over small rises.

ELECTRICITY:

Electricity is purchased from the Appalachian Power Company from their 33,000 KVA lines adjoining this plant. At the plant sub-station current is transformed to 2,300 volts, then transmitted over the plant area and to the River Pumping Station.

RAILROADS:

This plant has a direct connection to the Norfolk and Western Railway west of the Dublin Station.

STEAM:

Each area of this plant has its own boiler house with local distribution therefrom except that in the Administrative Area each building has its own heating unit built therein.

* * * * *

Construction of this plant was started February 10, 1941, and each building, utility, etc. when completed was accepted from the contractor and submitted to the Commanding Officer for acceptance by the Ordnance Department. These acceptances by the Ordnance Department were dated from December 23, 1941 to January 31, 1942.

Operation of this plant commenced September 29, 1941, and full operation started January 7, 1942.

Since January 31, 1942 (on which date the Construction Contractor completed his work), the operating contractor has made various improve-

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Authority *NND 735001*By *JW* NARA Date *9-23-02*

ORIGINAL
(Rec)

NROP 319.1
Subject: Annual Report
To: Chief of Ordnance

August 17, 1942

ments, alterations and additions to the plant as appeared necessary under actual operating conditions. The most important of these items is the proposed installation of a 420 BHP water tube boiler to supplement the two smaller boilers which now serve the Warehouse and Shop Area. Installation of this boiler has been authorized by the Chief of Ordnance and the contract therefor has been recently awarded.

c. Planning and Production: The following orders received and worked on during Fiscal Year.

- (1) A-1402: 105 mm. How., M2 - 2,283,000 charges. Started October 2, 1941.
- (2) A-1435: 155 mm. How., M1917-18, M2 (White Bag) 2,260,699 charges. Started November 19, 1941.
- (3) A-10.720: 155 mm. Gun, M1 - 400,000 charges. Started January 9, 1942.
- (4) DA-A-12.009: 155 mm. How., M1, M3 (Green Bag) 396,000 charges. Started June 1, 1942.

d. Housing: This plant is located eight miles from the town of Pulaski, Virginia, which had a population of approximately 10,000 people prior to the influx of defense workers.

The Government has constructed one-hundred-and-fifty units of two and three bedroom houses for the benefit of defense workers seven miles from the plant site and one mile outside of the City of Pulaski. These housing accommodations are filled, and there is a waiting list for any vacancies.

It is also understood that, in the future, it may become necessary that female help be used instead of male which would provide employment for a large number of residents who are now living within this immediate territory. This plant now employs approximately 3,000 people who are commuting from homes in a radius of sixty miles, and in the event that the plant should work on a three shift schedule, with its present equipment, it would require the employment of approximately 4,500 people.

Twenty dormitories have been constructed near the plant site and can accommodate approximately 1,000 single people, and it is understood that additions can be placed on these dormitories to increase their capacity to 2,500 occupants. At present these dormitories are approximately 2% occupied.

e. Accidents: From October 1, 1941 to July 1, 1942, there were sixty-eight injuries to War Department employees requiring first aid treatment, four temporary total disabilities, and one temporary partial disability. No compensation was paid for any of these injuries since the employees returned to work before any compensation became due.

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Authority NND 735001
By JW NARA Date 9-23-02

ORIGINAL
(Rec)

NROP 319.1

Subject: Annual Report

To: Chief of Ordnance

August 17, 1942

From January 1, 1942 to July 1, 1942 there were 2,373 injuries to the contractor's employees requiring first aid treatment, 37 temporary total disabilities, and one death resulting from an automobile accident. Records on injuries have been accurately kept only for the periods given above. There were no deaths, permanent total disabilities or permanent total or permanent partial disabilities to employees of the contractor during the year.

For the War Department during the period given above, the frequency rate was 14.86 and the severity rate was 0.04. For the contractor, the frequency rate was 10.53 and the severity rate was 1.72. All injuries are treated at the plant hospital or at the first aid station maintained in the bag manufacturing building.

For the Commanding Officer:

EMIL F. WERLY,
Major, Ordnance Department,
Executive Officer.

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Authority *NND 735001*By *JW* NARA Date *9-23-02*

ORIGINAL
(Rec)**RESTRICTED**

MASON & HANGER COMPANY

General Offices
500 Fifth Avenue, New York, N. Y.

From: A. B. Lincoln

Dublin, Va.

To: Messrs. Buck
Leadbetter
Lamparter
MacKay
Goodall
Hobbs
Ruefer
Bell
Lt. Walborn
Foulke

Jan 6, 1942

Re: Unfinished Work.

At the construction conference in Lt. Walborn's office this morning, it was agreed that the following items of work remained to be completed under this contract.

Roads and Parking Lots

Guard road near Dublin Cutoff gate; also near Bag Loading Area. Surfacing only.

Road between Hospital and Staff Quarters (drawing received today).

Road to Magazine Field Office (drawing received today.)

Road to Scale Repair House.

Road at Boiler House.

Roads at Igniter Hold Houses, Bag Loading Unit No. 3.

Parking Lot at Magazine Field Office.

Spike down timber curb in Main Parking Lot.

Paint center line markers at all road intersections.

Permanent Shop Area

Construct enclosed walkway, Change Houses to Bag Manufacturing Building (drawing received today).

Change escape platforms and construct Inspector's Office at Bag Manufacturing Building.

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Authority NND 735001By JW NARA Date 9-23-02

ORIGINAL
(Reg)

MASON & HANGER COMPANY

CONTINUED

Permanent Shop Area, continued

Complete ceilings at Bag Manufacturing Building.

Install panel board and miscellaneous connections for radio station at Guard Headquarters.

Install equipment in Combined Shops (equipment from Mason and Hanger Machine Shop to be moved by Hercules after completion of construction work).

Complete Boiler House.

Complete Switch House.

Inert Warehouse Area.

Provide Permanent steam connections and latest revised interior heating for Warehouses 103 and 207.

Make necessary revisions at Training School, Warehouse 103, desired by Mr. Breidenstein.

Bag Loading Area.

Complete Hold Houses at Bag Loading Unit #3.

Complete electrical installation, Loading Unit #2.

Construct walkways and resurface wheeling ramps #2.

Install sprinkler alarm systems.

Igniter Area

Remove barricaded safety doors and replace with suitable panels. Use these doors as replacements for damaged doors, Bag Loading Units No. 3 and 4.

Install water pressure reducing valve, Igniter Unit #1.

Install sprinkler alarm systems.

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MASON & HANGER COMPANY

CONTINUED

Black Powder Service Area

Complete H ubbellite.

Complete electrical installation.

Complete painting.

Install pressure control on boiler.

Install drainage for valve pit.

Water and Sewage Treatment Plants

Complete installation of fire pumps and panel board and concrete the floor in Filter Plant Pump House.

Complete installation of Norwood equipment.

Complete electrical and plumbing installation in Filter House.

Complete electrical installation in Sludge Pump House.

Complete Scale Repair House.

River Pumping Station

Complete electrical installation, including switchboard, floodlights, permanent cable.

Reconstruct building to provide bullet-proof protection.

Construct log boom.

Remove surplus wood piles and store suitably in Railroad Storage Yard.

Haul cordwood to Staff Quarters.

Auxiliary Water Supply

Protect from freezing all lines.

Make permanent electrical connections where necessary.

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ORIGINAL
(Red)

MASON & HANGER COMPANY

CONTINUED

Staff Quarters

Complete electrical work.

Complete rear and side walks.

Clean area between village and Old Rock Road.

Buildings, Miscellaneous

Complete Magazine Field Office.

Complete Hospital.

Complete Laboratory.

Construct 6 Chemical Toilets.

Set up Sentry Boxes around Guard Road.

Fences

Complete fence around Mason & Hanger Shop Area.

Install fence around Switch House, Metering Station (10 ft. fence),
Air Break Switch Poles (10 ft. fence).

Complete exterior fence and install all gates.

Complete fence at River Pumping Station and install gates.

Install guard fence at Change Houses (drawing received today).

Electrical

Install fence lighting fixtures and equipment.

Install permanent cables.

Miscellaneous

Complete embankment on north side of railroad at 10' x 10' box
culvert.

Clear and regard Railroad Storage Yard as necessary.

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(Red)

MASON & HANGER COMPANY

CONTINUED

Miscellaneous, continued

Complete fuel oil and gasoline storage.

Mr. Breckenridge's miscellaneous list.

In addition to the above, two items of work were suggested by Mr. Foulke without any conclusion being arrived at. These are: Loading Shelter at Main Parking Area, and Truck Shelter at Freight Transfer Area.

Resident Engineer

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ORIGINAL
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HISTORY

OCTOBER THROUGH DECEMBER, 1942

AND

SUPPLEMENT 2, to Contract W-ORD-492

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By JW NARA Date 9-23-02

ORIGINAL
(18)

New River Ordnance Plant

A résumé of the activities of this plant during the period October - December, 1942, is as follows:

The functions of the Fiscal Section were changed in accordance with the procedures prescribed in the Manual for Administrative Audit of Cost-Plus-A-Fixed-Fee Contracts. The pre-audit of invoices by the Fiscal Section before payment by the contractor was discontinued. Invoices are now paid by the contractor and then Form 1034 (Reimbursement Request) is submitted to the Field Auditor for transmittal to the Finance Officer. The Field Auditor no longer audits every reimbursement request, but it is left to his discretion as to how many and which vouchers should be audited to meet the requirements of the manual.

The Payroll Department no longer checks 100% the contractor's payroll, but certain portions are selected to be checked. The Government does not require witnesses in every booth at the pay-offs but the number varies, though usually around 50%.

The Time Checking Department does not check the entire force of the contractor, but each day a certain crew is selected and it is checked 100%.

The change in the Fiscal and Accounting procedures has enabled the Ordnance Department to reduce the number of personnel in this section by eleven. It is anticipated that further reduction will result because of resignations and Selective Service, and these jobs will not be filled.

The Ordnance Department Staff has been reduced from 247 to 187 as of December 31, 1942. In accordance with the directive from the Chief of Ordnance dated October 3, 1942, the contractor assumed many of the functions pertaining to property checking, historical and stock rec-

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ords, thus releasing approximately one-fourth of the personnel in the Property Section. Some of these employees were transferred to the contractor, some were transferred to other Ordnance plants and some were drafted or volunteered for the Armed Forces. It is anticipated that further reductions will be made until the staff is about one hundred-and-twenty-five.

The Chief of Ordnance has delegated authority to this plant to appoint and change the status of employees without prior approval from that office; however, this office submits Form CP-50 on each employee showing the nature of the action taken. During the period October - December, eighteen male and one female employees were granted military furloughs. These employees were informed of their statutory right of re-employment to a position in the Federal service, provided they make application within forty days after they are relieved from military duty.

In compliance with War Department Circular 412 and Ordnance Department Order 377, and Change #1 thereto and Orders "U", Office of the Secretary of War, a work week of forty-eight hours was established for all Ordnance Department employees. The new procedure requires that an individual earnings record be maintained for each employee, on which is recorded a complete record of each person for his or her period of service at this plant. These records are to be audited semi-annually by the General Accounting Office. This office also submits to the Finance Officer a schedule of deductions by the employees for the purchase of War Bonds; these bonds are mailed to this office for distribution instead of being handled by the Chief of Finance. This will expedite the mailing of bonds to the purchasers and will be an incentive for them to increase

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their deductions. Overtime is paid in accordance with the aforementioned directives, i.e., Saturday is considered as the day for which overtime is paid and an employee is considered in pay status, and is paid accordingly if he is on annual or sick leave.

In October 1942, the Chief of Ordnance directed the discontinuance of activities by the War Department where they duplicated those of the contractor. This resulted in the discharge or transfer of the personnel who maintained all Engineering files and records.

The Engineering activities during this period consisted of normal maintenance and repairs to the plant by the contractor with the exception of the following major items of construction, all of which were submitted to the Field Director of Ammunition Plants in St. Louis in accordance with Section F Part 10 of Ordnance Procurement Instructions. These items with the approved estimated cost for each were as follows:

<u>N.R.O.P Proj. No.</u>	<u>Approved Est. Cost</u>	<u>Description</u>
No. 1	\$ 2,600.00	Purchase and installation of 300 kva of capacitors to correct electric power factor.
No. 3	1,800.00	Increase width of walkways outside of Bag Loading Buildings opposite certain doors to permit safe turning of powder hand trucks.
No. 4	12,950.00	Construction of 6 inert warehouses at Bag Loading Lines Nos. 1, 2, and 3.

In addition to the above items of work, the following projects were undertaken as follows:

- (a) Procurement and installation of one 420 BHP Water Tube Boiler for heating the Warehouse and Shop Area in the amount of \$30,000, authorized by Change Order A to the Operating Contract.
- (b) Procurement and installation of four 20,000 gallon steel tanks to maintain the two months reserve of fuel oil. \$8,000.

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Authorized by the Field Director of Ammunition Plants in accordance with General Mailing Letters 63 and 63-A OOSL.

- (c) Remodeling of old Temporary Employment Office of the Constructing Contractor for use as temporary Recreational Hall. \$11,900 was approved by the Field Director of Ammunition Plants as expenditure for this project.

In addition to the above construction undertaken and/or completed during the last quarter of 1942, the following items of construction were submitted for approval in accordance with Part 10 of Ordnance Procurement Instruction:

<u>N.R.O.P. Proj. No.</u>	<u>Estimated Cost</u>	<u>Description</u>
No. 5	\$19,250	Construction of Black Powder Magazines, Wheeling Ramps, Barricades, etc., as additional facilities to the Black Powder Drying and Screening group (This Project was approved 1-19-43).
No. 6	2,310	Erection and equipment of canteen and bus waiting room. (This project approved 1/2/43).
No. 7	69,650	Construction of building and facilities for crating bundled ammunition for overseas shipment. (This project was approved 1/19/43, in the amount of \$64,150).

The Safety and Plant Security Departments have maintained their vigilance in checking the various departments in the production areas for any violation of safety regulations and to correct same immediately. Joint visits over the plant were made by the Ordnance Department and contractor safety inspectors.

Serious congestion occurred in the Inert Material Warehouse Area in the earlier part of this period. Storage space of all kinds, both of inert components and of powder and assembled charges was at a premium here as elsewhere. This condition was relieved by the shipment of inert material to other plants, by decreasing inbound shipments and by the

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careful use of all available space. The revision of AR 700-10, Section IV increased inert warehouse capacity by eliminating the aisle around the edge of each warehouse.

Fifty-nine igloo type magazines were constructed on this plant site by contractors under the supervision of Radford Ordnance Works. Part of the magazines are now completed and are being used for the storage of smokeless powder and assembled propellant charges. The Radford Ordnance Works ships powder to this plant after the lot is completed to be held for storage until it is accepted by the Chief of Ordnance. The continued use of one of the magazines has been requested for the storage of adhesive tape. Proper humidity and temperature conditions for the storage of this component material are obtainable in no other warehousing facility at this plant.

Precaution and steps have been taken to decrease the hazard of Class II fires, such as clearing grass and brush from the magazine areas. Plant personnel have been trained to combat fires arising from grass and brush and each person is given thorough instruction as to what he should do in such instances.

The frequency and severity of injuries to the personnel has decreased in spite of the steady influx of new employees, both men and women. The average frequency for this period was 3.73 and the average severity rate was .029, with six accidents in the three months which resulted in forty-seven days' lost time. The number of occupational first aid cases decreased slightly during the month of December to 152, but the average number per month for this period was 158.3. Foremen are now rated by the frequency of accidents to their personnel which require first aid or which may cause lost time. Safety conferences of

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both employees and foremen have been established where safety procedures to be followed in the Production Areas are discussed. The safety consciousness of the older employees has been communicated to the steady stream of new comers and this is reflected in the fewer accidents to the new employees. Match searches are made at irregular intervals which resulted in two week lay-offs for those found carrying matches. Those working in the Loading Lines are required to wear the proper safety clothing and inspectors or other personnel who for business reasons enter the lines are required to wear safety shoes.

During this period the percentage of Ordnance Department employees to the total decreased from 7.63 to 6.31 while the percent of all women employees increased from 26.3 to 28.4. Total male employees decreased one-hundred-and-fifty, and women employees increased eighty. Total personnel decreased from 2988 to 2919 but total hours of employment increased from 535810 to 542145.

Suggestions have been made by the Safety Department to aid the "Keep Them Shooting" Campaign of the contractor, to promote both morale and production. War Department personnel have attended the showing of films by the contractor on safety and ordnance production.

During the period covered by this report many changes were made in the maintaining property accountability records, thereby reducing the number of employees in this department by about 36%.

The Ordnance Department discontinued the checking of materials and supplies upon the receipt of them. The contractor's warehousemen checked the materials, prepared tally-in sheets, and the Government Receiving Department made spot-checks, approximately 10%. The contractor's receiving reports are now used for the original source of property ac-

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countability, thus discontinuing the use of Q. M. C. Form 431, Government Receiving Report.

A representative from the Transportation Corps visited this station in November at which time the advisability of entering into a storage and processing in transit agreement with the railroad was discussed. The accomplishment of this is now in the hands of the Transportation Corps, and if installed, it is believed a considerable saving to the Government in transportation cost will result; approximately \$100,000 per year.

The shipment of propelling charges is carried out in the usual manner, and as rapidly as possible after their completion and are turned over to the Field Service Representatives.

All production orders as such were cancelled as of December 1, 1942, and monthly loading schedules were furnished for each type of charge. Inasmuch as the loading schedule gives the contemplated loadings for the next year it enabled the contractor to adjust his force and release many trained personnel to Radford Ordnance Works and to other Ordnance establishments.

Another request to the Chief of Ordnance for permission to change a particular phase of the loading procedure, which was omitted from the previous report, is submitted herewith. This office requested permission that in cutting the 31" x 32" bodies for the 10" Gun from 40" wide Grade "A" Silk cloth a usable strip about 5" wide running the entire length of the lay was produced on each cutting. This 5" strip was too narrow for cutting circles or for any other part of the assembly requiring Grade "A" Silk Cartridge Bag Cloth. Although it was being saved for any possible future use it appeared unlikely that the cloth

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would be utilized in any application requiring Grade "A" silk. The reinforcing strip 34-3/4" x 4 1/4") Part Number 71-9-134E1 specified to be made of Grade B silk cartridge bag cloth is of an exact size to be cut from the strip left over from cutting bodies. If it were permissible to substitute Grade "A" silk in this application, a considerable saving in cloth and operating time could be made. The Chief of Ordnance approved the use of the five inch wide strip, salvage Grade "A" Silk Cartridge Bag Cloth, as reinforcing in the lacing plate on the 10" Gun Propelling Charges, Model 1888 and 1895.

Listed below is a summary of production of propellant charges at this plant for the period October - December, 1942:

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Authority: ND 735001
By: ANARA Date: 9-23-02

SUMMARY OF PRODUCTION BETWEEN OCTOBER 1, 1942 and DECEMBER 31, 1942

Prod. Order Rec'd. & Worked on from 10/1/42 to 12/31/42	Caliber & Model of Gun and Charge	Original Quantity of Order	Production Started	Charges Accepted From 10/1/42 to 12/31/42	Remarks
A-14,65	155 mm. Gun, M1	259,672	8/1/42	39,988	Prod. Order cancelled 12/1/42. Amt. Accepted through 11/30/42-71,730 Chg.
155 mm. Gun, M1	155 mm. Gun, M1	None	12/1/42	79,623	
A-10,709	105 mm. How.M2	5,977,000	7/15/42	900,027	Prod. Order cancelled 12/1/42. Amt. Accepted through 11/30/42 - 1,717,859 Chgs.
105 mm. How., M2	105 mm. How.M2	None	12/1/42	530,668	
A-10,740	155 mm. How.M1 (Green Bag) M3	1,616,899	8/20/42	289,991	Prod. Order cancelled 12/1/42. Amt. Accepted through 11/30/42 - 484,825 Chgs.
155 mm. How.M1 (Green Bag) M3	155 mm. How.M1 (Green Bag) M3	None	12/1/42	183,039	
A-10,719	4.7" A.A. Gun, M1 Igniter Assembly	579,000	11/2/42	30,000	Prod. Order cancelled 12/1/42. Amt. Accepted through 11/30/42 - 30,000 Chgs.
4.7" A.A. Gun, M1 Igniter Assembly	4.7" A.A. Gun, M1 Igniter Assembly	None	12/1/42	22,000	

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The contract between Cooley's Inc., and Hercules Powder Company to operate cafeterias, dining halls, and canteens on this plant site was cancelled and a contract was negotiated with the Pennsylvania Turnpike Shops Inc., to take over these activities. The Turnpike Shops agreed to pay the operator-contractor \$25.00 per month for the privilege of operating these concessions. They also agreed to keep accurate records of their operations and submit their books to the Hercules Powder Company monthly for audit by their Accounting Department.

Soon after the new contract was negotiated for operating the cafeteria a serious shortage developed in supplying meat. However, after contacting the various meat packing companies, and a representative from the Ordnance Department contacted the Office of Price Administration in Washington, they were able to secure more meats. Their meals are satisfactorily prepared and their prices are similar to those charged in cafes in Dublin, Pulaski and Radford--35¢ to 45¢ per meal, depending upon the selection of foods, as each item is individually priced.

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